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(Report on Clinical Use of Bone Meal. Martin, E. M., Jour. C.M.A., Vol. 50).*

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Surveys and Health Insurance

THE HONOURABLE IVAN SCHULTZ

Minister of Health and Public Welfare,
Province of Manitoba, Winnipeg

THOSE of you who have been associated with public health over a long period of years will, I think, agree when I say that there is not always a steadied and continued progress in health reform. Reforms in one field or another, like civilization, move forward by jerks. Often the jerk is caused by some calamity. Typhoid fever epidemics were responsible for the improvement of the water supply of many cities in years past. Floods are often followed by the construction of break-waters and works for river control. People learn by experience, by suffering. The university of hard knocks is one in which we are all classmates. In Canada the impact of war quickly brought to light many inadequacies of our then-existing social services. These inadequacies were noticed first in the Health Branch of our department. When it became apparent that a very high percentage of those applying for enlistment in our armed forces were unfit for military service overseas, we naturally were much concerned. A survey of a large and selective group of young people in our province showed that, of the thousands studied, not more than 25 per cent could be considered as having normal health. This indicated to us that some new plan of providing health services should be inaugurated immediately, not only to render maximum assistance in the war effort, but also to provide adequately for the future peace.

I take it for granted that you would all agree when I say that the first consideration in any planned program of public health is that those responsible for the planning must have a thorough knowledge of all the essential and fundamental facts. The need for planning, the nature of planning, and the manner of planning for public health programs will vary in the different

Presented at the thirty-third annual meeting of the Canadian Public Health Association, held in Toronto on November 6-8, 1944.

provinces of Canada because there are basic differences in conditions and circumstances and many other fundamental factors. One important factor in our province is the peculiar distribution of population. Only one-seventh of the province is inhabited to any real extent. Ninety-eight per cent of the population live in a district comprising only one-seventh of the total area of the province; and of that 98 per cent, 40 per cent is segregated in the City of Winnipeg. In other words, we have one large centre of population possessing every modern advantage of civilization readily available to 40 per cent of our people, whereas the remaining part of the population is scattered, in small cities and towns or in strictly rural districts. In the immense area lying to the north, comprising six-sevenths of the province, are small isolated settlements—groups of farmers, fishermen, fur-traders and others. With a population so diverse, so distributed, so sparse in many parts, and with economic conditions varying so much, it is obvious that any plan of public health must be definitely related to the needs of the particular groups or districts. It becomes a problem which only experts can solve. What services should be given? How should such services be administered? How should the cost of such services be distributed? In such circumstances, planning is not only advisable, it is absolutely compulsory.

In order that the type of organization set up could take care of present and future needs, it was thought desirable to have, as a basis upon which to plan, a complete investigation made of our needs and resources in the health field. It is logical to suppose that if one is going to build a house one will have a competent person prepare the plan, taking into consideration present and potential resources and the building material available. It seemed to us that the same applied to building a really worthwhile health service. As a first step, we contacted the most competent authority on public health we could find, the American Public Health Association. In 1941, through their good offices and with financial assistance from The Commonwealth Fund, Dr. Carl E. Buck and his associates made a complete survey of the health facilities in Manitoba. In making this survey Dr. Buck had a competent staff work for months to secure the necessary data and information, and no effort was spared to obtain all the facts. In discussing the matter with him, I was amazed at his detailed knowledge of the situation in our province. In addition to making the survey, he prepared a plan for the immediate reorganization and future development of the health services of the province. Broadly speaking, this plan provided that the health resources we had available should be used primarily in the age group of 15 to 25 in order that these young people might be made as physicially and mentally fit as possible, since the man and woman power required for the prosecution of the war would be recruited from that group.

It was also recommended that a determined effort be made to decentralize to the greatest extent possible all public health services; in other words, to bring these services close to the people by establishing a complete coverage of the whole province through full-time local health units. A general reorganization of the staff was recommended with this in mind. It was further suggested that one rural area of the province be immediately set up as a demon-

stration full-time rural health district, and that this district be used also as an in-training centre for personnel.

Since the completion of the study and its acceptance by the government, the progress of our efforts has been extremely satisfactory. Despite the wartime difficulty of obtaining personnel, new divisions of local health service, industrial hygiene and health education have been organized; reorganization of the venereal-disease and tuberculosis control programs has been completed, and a start made in setting up new divisions in nutrition and in maternal and child hygiene. We also have the authority of the government to establish a province-wide mental health program as soon as personnel can be secured, and this also has been started within the last two months. I am fully convinced that when this plan is completely functioning we shall have a service in this field which will adequately meet the many problems in mental health, particularly in its preventive aspects. Altogether our appropriations for preventive services have been increased by over 50 per cent in the three years since the survey was made.

In the course of the study it was brought to the attention of the authorities that the present method of establishing and maintaining hospitals within the province, particularly in our rural areas, was somewhat haphazard, some portions of the province apparently having too much hospitalization and of inadequate quality, while other parts had far too few hospital beds for the population to be served. The report suggested that a special survey of hospitalization should be undertaken. On the basis of this recommendation the legislature granted to the department a sum of money to set up a hospital commission, as recommended by Dr. Buck. This work was assigned to the Welfare Supervision Board, a body established by statute to carry on investigations at the request of the government. A field secretary was provided and the board had as consultants Mr. Graham L. David, Hospital Consultant of the W. K. Kellogg Foundation, and Dr. E. W. Williamson, Associate Director of Hospital Activities of the American College of Surgeons.

Before the study was completed it became apparent that one of the main recommendations would be the establishment of a permanent hospital council to advise the government, through the Minister of Health and Public Welfare, on all the various problems of hospitalization, including the establishment of hospital districts, the size and type of hospitals that should be built in any area, and the methods by which hospitals should be financed. As a result of this knowledge of what one of the recommendations of the hospital commission was likely to be, appropriate legislation was prepared and passed at the latest session of the legislature, and a hospital council established despite the fact that the report of the commission was not then available. It was thought desirable to anticipate the recommendations of the commission in order that plans might go forward as rapidly as possible to put hospitalization throughout the province on a sound and satisfactory basis, particularly in view of the fact that the legislation for health insurance, under consideration by the Federal Government, included complete hospital care among its chief benefits. The hospital council has been in operation for some three months and has considered some ten applications for permission to construct new hospitals;

has made a very substantial start in dividing the province into hospital districts and has almost completed plans for a standard type of hospital for rural communities.

With these two studies completed and presented to the provincial government, we are now in a position to plan for complete health services for all our people. If and when the pending federal legislation to inaugurate health insurance is passed, we shall be ready to go forward and provide especially for our rural people who have always suffered most severely from the lack of adequate medical care. The health and hospital surveys have made the plans for this progress possible.

In Manitoba the Departments of Health and Welfare are combined under one minister. As the war has progressed it has become increasingly evident that we must reorganize our social services, not only to meet the problems of welfare arising out of the present conflict, but in anticipation of greater responsibilities in time of peace. As in the field of health, we approached the most competent authority we could find in the welfare field—the American Public Welfare Association, and requested that they make a study of our social services. Under the supervision of Mr. Howard L. Russell, Director of the Association, this survey was completed and the report was presented by Mr. Russell to the Government on the 20th of September, 1944. Like the health survey, it suggested that there should be a streamlining of the present set-up of the department, and that certain items of welfare which presently were not under the jurisdiction of Health and Public Welfare, should be placed thereunder—old-age pensions, pensions for the blind, and public assistance, and that the department's welfare activities which had been chiefly concerned with the child welfare field should be broadened to take in the other welfare services mentioned.

There are other interesting recommendations but I shall mention only one because I believe it is a challenge to both health and social workers. Mr. Russell recommended that there should be set up at the local level in one district a combined administration of health and social services in order to try to ascertain what advantage this might be from the standpoint of rendering more service to the people in both these fields of welfare. Plans are now going forward to make this recommendation effective in the district where we have already in operation a demonstration full-time health unit as recommended in Dr. Buck's report. We intend to take over the activities of the Children's Aid Society in this district, combine these with the probation work of the Juvenile Court and with the regular public welfare activities such as mothers' allowance, old-age pensions, etc., and place all social services with the health unit under one joint administrative office. We will have a single filing system and a generalized office staff. As you can well imagine, such an experiment may present some difficulties but we believe that these can be overcome by a proper plan of in-service training. It would seem to us that in a rural area such as Manitoba finances will never be such as to allow a complete separate set-up for health and for social services. There is much to be gained by amalgamating these services at the local level—surely a greater coverage of the needs of our people could be made at less effort and less cost and less

overlapping than at present. We hope that this experiment will be in operation sometime early in 1945. This of course will mean the greatest degree of co-operation, especially in the field staff of public health nurses and social workers. But think what it will mean in efficiency and elimination of overlapping. Instead of having a single file in two separate offices for each individual in a family, we can have a complete family file in one office. The value of such records in community service cannot be overestimated.

As a supplement to all these surveys completely covering the present and suggested future services of the department, it was thought desirable to have some detailed study of the statistical material within the department, and the methods by which the statistics available might be better correlated and used in order to give us a running story of what is happening to our people. This study was made by one of Canada's outstanding vital statisticians: Dr. Mary A. Ross, who at that time was a member of the staff of the School of Hygiene, University of Toronto, and is now Field Research Assistant in the Vital Statistics Branch, Dominion Bureau of Statistics, Ottawa. Her report is being considered by the officials of our department in order to see how the plan suggested might best be inaugurated.

After considering this series of studies, which have gone on almost continuously in Manitoba since 1941, there are several important points which we see in respect to them, particularly as they affect planning.

Every organization should at periodic intervals have an evaluation made of its resources and practices. When a study is made it should be made by the best-qualified person available in the particular field being studied, and preferably by someone outside the organization in which the survey is being made, in order that a completely unbiased report may be presented. When the study is completed and the report prepared, it should be presented to the government by the individual in charge of the study. In Manitoba, the report on health and the report on welfare were presented to the Cabinet-in-Council of the provincial government by Dr. Buck and Mr. Russell in person. You may ask, "What is the benefit of such a procedure?" In the first place, it gives the government or the leaders of the government a chance to see and talk with the individual who has actually made the study. Secondly, it impresses on the government, more than any of their own officials could, the necessity of the suggested changes. Thirdly, the news value of and the public interest in the report are greatly enhanced. Fourthly, it has a tendency to make the government decide immediately whether or not they will accept the report and put the recommendations into operation. A written or printed report can be so easily filed away and forgotten; an able and informed individual cannot be ignored. As one instance, we cite what happened in respect to the presentation of the report on health. After the Cabinet had heard what Dr. Buck had to recommend, the Premier of the province said, "Dr. Buck, this is an ambitious program and I take it that it will require several years to complete. Will you and Dr. Jackson get together and set these recommendations out in the order of their importance and indicate what is required in the way of funds and legislative action so

that we may have a pattern to follow?" This was done and it has now become automatic to implement the recommendations as we are able to get personnel, since no difficulty arises in making provision in our budget for the new services recommended.

Another important fact about surveys is the necessity of the person making the study, or someone representing him, returning to the province at regular intervals to find out what is being done, and what else is necessary in the way of pressure, if you will, in order that the reorganization may be hurried along. Dr. Buck has been back to Manitoba on two occasions since the study was completed in 1941, and his assistance in going over what we have done and what we are planning has been invaluable. Mr. Russell of the American Public Welfare Association intimated that he is prepared to do the same thing for the welfare study.

It will be clear from what I have said that I firmly believe that intelligent planning based on a full knowledge of the facts is absolutely necessary to determine the proper course of action for the future in either health or welfare. I think in the making of a new and better social order we in public health must rest our hopes not on any ill-founded or visionary theories, but on intelligent planning based on accurate surveys. It is a good thing to talk of a better day, a brighter future. It is a better thing to help make it a reality. The realities of tomorrow are based on the realities of today. When we come to the field of public health, we are dealing with a matter that affects all our people. Lord Beaconsfield once said: "The health of the people is really the foundation upon which all their happiness and all their powers as a state depend." Remembering this, let us forget all political considerations; let us forget our preconceived ideas and ancient prejudices; let us forget our vague theories and incomplete accomplishments; then let us seek and find all the essential facts in regard to our basic problems of health; let us establish those facts beyond any fear of contradiction; let us be prepared to justify them under all circumstances. Then, and only then, shall we have the starting-point for intelligent planning because we are standing on the vantage ground of truth.

The Public Health Aspects of Venereal Disease Control

THE HONOURABLE R. P. VIVIAN, M.D.
Minister of Health and Public Welfare
Province of Ontario

THE problem of venereal disease and its control has been of increasing concern in the last few years. In Ontario, venereal-disease control was, until 1939, a responsibility of the Division of Communicable Diseases. At that time a separate division was created to deal more effectively with this menace. The impact of war upon our population, and its disruptive influence on home and family life, had created such a situation by 1943 that it became imperative to reorganize the Division of Venereal Disease Control.

A great deal has recently been published, and much has been done, in the matter of bringing this problem to the attention of the population through organizations of various sorts. I believe that it will be of interest, and I hope useful, to place before you, in as concise a form as possible, the scope of the problem and the objectives of those officially concerned with its control, and to outline the role of the official agencies.

In Ontario, more than 50,000 cases of venereal disease have been reported to the Department of Health since the onset of war. In the years 1937 to 1943 inclusive, the total number of venereal infections reached almost 70,000. More than half of these were the more serious illness, syphilis. More important than even the total number of infections is the fact that, with every year of the war and until 1944, there has been an increase in the number of cases reported. There were over 1,000 more venereal infections brought to our attention during 1943 than in 1942, making the enormous total of more than 13,000 in 1943 alone. Some 7,000 of these were case of syphilis, and more than half of them were freshly acquired since the outbreak of war. The most serious fact is that, among these 7,000 cases, there were almost 500 showing evidence of serious damage to the brain and nervous system. The importance of this will be recognized when I tell you that, for the past fifteen years, one out of every eighteen persons admitted to our mental hospitals has been a patient because of syphilitic infection. But it is not merely adults who have suffered. These figures include a number of tragic cases of little children, born with syphilis acquired from their mothers.

These official figures tell only a small part of the story of this major health problem. From a study of the departmental records, there is ample reason to believe that, for every reported case of syphilitic infection, there are at least two more people in Ontario who have syphilis but many of whom do not even know that they are so affected. For every reported case of gonorrhoeal in-

Presented at a Panel Discussion on Venereal Disease Control held in Toronto on February 5, 1945, under the auspices of the Health League of Canada.

fection, it is believed that as many as four or five other people have this disease. These cases have not been reported, probably have not been diagnosed, and treatment has not been undertaken.

Venereal disease is a communicable one, acute in character, chronic in effect. As such, its control becomes a problem for government health departments. I use the word "government" in this connection in its inclusive meaning. In Canada we have three levels of government: Municipal, Provincial and Federal. In matters of health, the roles that must be played by Provincal and Municipal governments are clearly defined. There is no such definition regarding the role of the Federal Government. I am hopeful that the time is not too far distant when there may be a clearer allocation of responsibility between the Province and the Dominion.

Such a satisfactory arrangement can be achieved only if its true purpose is the basis for consideration. The true purpose is unquestionably the wellbeing and health of all Canadians. At the present time, there is a tentative working arrangement regarding venereal-disease control between the Federal and Provincial Governments. This is purely a financial one. The Federal authority has allocated some $240,000 for Canada, to aid the Provinces in their programs of venereal-disease control. Ontario received from this fund, conditional upon the undertaking of an approved program, some sixty thousand plus dollars per year. In addition to this amount, the Provincial Department of Health spent in 1944 the sum of approximately $160,000.

The responsibility for the control of communicable disease has definitely been allocated by statute to the Provincial Governments and through them to the municipalities. The authority to legislate in respect of property and civil rights is a clearly defined responsibility of a Provincial Government. It is only by exercising this authority that communicable disease can be controlled by appropriate health departments operating under The Public Health Act, a Provincial statute.

The control of any communicable disease may be considered under four headings: the diagnosis of the condition; the responsibility of seeing that appropriate treatment is carried out for the individual so that he ceases to be infectious and those who come in contact with him are protected; the responsibility, as an authoritative agency, for enlightening the public regarding such illnesses; and recommendations, outside the strictly medical field, for dealing with the problem generally.

The control of venereal disease is a problem with certain special difficulties not met with in other communicable diseases. These difficulties are of a social and moral nature. To supplement the provisions of The Public Health Act in relation to the control of venereal disease, a separate statute has been passed in Ontario, known as The Venereal Diseases Prevention Act. By this law, certain definite duties of health departments are recognized and the way is provided for performing such duties.

The Government of the Province of Ontario has recognized its responsi-

bility to carry out the provisions of these Acts. To deal with this increasingly serious problem, a greatly expanded program has been initiated in the Venereal Disease Control Division of the Department of Health. This program has seven important objectives:

(1) An assurance of adequate medical care to every person in this Province suffering from venereal disease. Every person in need of treatment must receive it. Many patients will seek medical care through their private physicians. The Department of Health is making it possible in such cases for physicians to provide all necessary care, regardless of the patient's economic condition. In some instances it will be necessary for the Province, through the Department of Health, to pay the full costs of this treatment.

(2) The establishment of a program of health education on venereal disease. We firmly believe that venereal disease is widespread today largely because the people are unaware of the facts. This can be overcome by a sound program of public education, presented in an acceptable manner.

(3) Dealing with the problem of undiscovered cases. The Department of Health is developing a field service of carefully selected, trained workers, who will assist the local communities in their campaigns against venereal disease.

(4) Stimulating the local community into taking such action as may be required to correct defects in community life so that the incidence of venereal disease may be lowered.

(5) Protection of our homes and families. Young people planning marriage must be taught the facts and should have a premarital blood test.

(6) The Department of Health has outlined measures to ensure for the unborn the fullest protection from congenital syphilis. Treatment of a mother before the birth of the child will prevent the transmission of the disease to the child.

(7) The Department is concerned with the advancement of teaching and research. There is a wide opportunity and a great need for the teaching of venereal-disease control. Of all the Provinces of Canada, we are particularly well-equipped for this task. Our large, modern hospitals, three university medical schools, and excellent research laboratories can be utilized for this purpose.

In Ontario the public health aspect of venereal-disease control is clearly defined. Municipalities have their being in relation to the Provincial Government. So also are municipal departments of health closely associated with the Provincial Department of Health in matters of public health. The public health aspect of this problem can be accomplished through these two agencies. Each authoritative health group has certain duties and responsibilities.

The Provincial Department has undertaken to provide the following services for venereal-disease control:

1. The provision of free laboratory services for diagnosis, and free drugs for treatment, together with a cash subsidy to clinics where treatment is provided.

2. Special fever treatment for selected cases.
3. Financial reimbursement to the municipality for a high percentage of their expenditures.
4. Payments to the hospital for ward care of selected cases.
5. The provision of educational material.

Furthermore, the Department stands ready to assist in the development of any part of an acceptable program by the municipal health authority. Such assistance from the Provincial Department is substantial in character.

One of the difficulties in carrying on an effective program for venereal-disease control has been the inadequacy of the health services within many communities. In Ontario there are some 900 autonomous municipalities, each with a medical officer of health and a sanitary officer, responsible to a local board of health. Only 15 of these medical officers of health are employed full-time. Beyond being graduates in Medicine, relatively few of the others have any qualifications for this type of post. A large number of the sanitary officers have no qualifications, and 95 per cent of them are employed only part-time. The average remuneration for a part-time health officer is probably between $100.00 and $150.00 per year. For this amount, he is expected to deal with all of the community health problems. An attempt is now being made to change this outmoded system of local health administration.

Public health today is as much a specialty as surgery or any of the other specialized divisions of medical practice. By an amendment to The Public Health Act, passed at the last session of the Ontario Legislature, it is now possible for municipalities to combine to form a unit for public health administration. This is particularly applicable to small urban and rural areas. Such units can be combinations of adjacent municipalities or comprise the entire county. In the majority of instances, the latter is the method preferred. Such a unit would employ full-time, specially trained, and competent personnel. The establishment of these county health units will be largely dependent upon our ability to find and to train adequate personnel. To a great extent, this will have to await the successful conclusion of the war.

I wish to point out clearly that the prevention of disease and the safeguarding of good health in the community are direct responsibilities of the local health authority. The problem of venereal disease is greatest in those centres of large population, most of which are now equipped with full-time health departments. I am sure they are ready and willing to undertake their task. Such local responsibility might be clarified as follows:

1. Every community must see that treatment is provided when necessary, and that every case of veneral disease is treated in a manner considered adequate by the attending physician.
2. Sources of infection must be located, examined, and placed under treatment.
3. Those cases which may exist without the knowledge of the affected individual must be discovered.
4. Subject to the authorization of the local medical officer of health, all accounts

incurred in the carrying out of the provisions of The Ontario Public Health Act and its Regulations must be paid.

I have outlined the way in which the public health departments of the Province and the municipality may combine to bring about an effective measure of venereal-disease control. May I summarize the four salient points with which the public health aspect of venereal-disease control is most concerned:

1. The dissemination of accurate and factual knowledge to the general public.
2. The discovery of existing disease.
3. The treatment of such cases.
4. The correction of conditions which lead to the spread of venereal disease, by drawing public attention to those phases of the problem over which a public health agency cannot exercise control.

The effectiveness of this program is shown by the fact that the rate of syphilis of all types reported in Ontario during 1944 was 141 per 100,000 population, as compared with 180 per 100,000 population during 1943, a reduction of 21 per cent. The low incidence of venereal disease in countries such as Norway and Sweden, in the pre-war period, was achieved by an effective public health program combined with excellent co-operation from the citizens.

I fully realize that such measures alone cannot stamp out venereal disease. The other aspects of this problem require the attention of religious bodies, educational authorities, welfare groups, and law enforcement agencies. It is only by the co-ordinated action of all these groups that we can achieve our objective. Official agencies such as I have described can be greatly assisted in carrying out their duties and responsibilities by the co-operation of the citizens of the community.

Voluntary organizations of these citizens have a definite role to play in connection with venereal-disease control. Their task—and it is a most useful one—is to assist the official agencies. It is the task of the public health group to assess the problems and needs of the areas, to outline the educational campaign, and to promote a satisfactory control program. The role of the voluntary agency is to help in carrying out such a program by interpreting to the community what is actually contemplated. In addition they can lend assistance by stimulating public support on a wider basis than is possible for any health authority.

SUMMARY

In the foregoing, I have attempted to outline the defined duty of the authoritative health agency in venereal-disease control. It is hoped that the tasks of these agencies will be undertaken without reserve. They will be assisted by the co-ordinated efforts of religious bodies, educational authorities, welfare groups, law enforcement agencies, and voluntary organization of citizens of the community.

The Organization of Laboratory Services*

Observations from a Recent Visit to Britain

G. D. W. CAMERON, M.D., D.P.H.

Chief, Laboratory of Hygiene
Department of National Health and Welfare
Ottawa, Ontario

IT was my privilege recently to visit the people in the United Kingdom who are responsible for developing and operating the expanded laboratory services in England and Wales, and Scotland. There are some striking features in their arrangements which may interest you. South of the border two services have been set up: the Emergency Public Health Laboratory Service and the Pathological Laboratory Service. These are new undertakings, whereas the changes in Scotland have taken the form of an expansion of already existing arrangements.

The story of the setting up of the Emergency Public Health Laboratory Service in England and Wales has been told in the BRITISH MEDICAL BULLETIN, Volume 1 (1943), No. 4. The situation was studied before the war and the picture disclosed was very disturbing, especially in light of the almost certain approach of war. A very unbalanced distribution of personnel and facilities was found. Many of the best men and laboratories were in large centres where they would be most subject to bombing. Large areas of the country, including fair-sized cities and towns, were without any service. It was fully expected that bombing would disperse city populations to the country, with resultant acceleration of the spread of contagious disease (happily this was not borne out). For these reasons and because they wished to be prepared for any calamity wherever it might strike, a plan of dispersal of staff and equipment was drawn up. On the outbreak of war this plan was implemented. Professor G. S. Wilson, who is in charge of the organization, now has a network of laboratories covering all of Britain south of the border. They are housed in all kinds of places, sometimes with the Pathological Laboratory Service and sometimes alone. They are organized in districts with a principal laboratory for the district. At the centre is the headquarters laboratory. Professor Wilson derives his authority from the Medical Research Council, which operates the service on behalf of the Ministry of Health.

One might venture to sum up the attitude of the service by saying that they propose to *apply* bacteriology. Each laboratory director is a medical graduate with special training in bacteriology. If they do not think him well-enough qualified as a bacteriologist, they will train him and promote him within the service, moving him from place to place as required. By "applying" bacteriology they mean that the director, or a member of the staff, must be prepared to go

**From the Chairman's Address given at the dinner session during the thirteenth annual Christmas meeting of the Laboratory Section, Canadian Public Health Association, held in Toronto on December 18 and 19, 1944.*

into the field as an epidemiologist to gather his own information at first hand, and to take his own samples directly from the patient or suspected carrier, or from whatever the source. A couple of quotations from Dr. Landsborough Thomson's article in the BRITISH MEDICAL BULLETIN, already referred to, throw light on this point of view:

"Most local authorities are thus compelled to rely on such assistance as can be obtained from laboratories intended primarily for other purposes. Many university laboratories, for instance, undertake routine work for neighbouring local authorities, but this function is naturally subordinate to the claims of teaching and research. The work done is of a high technical standard; but it cannot easily extend to the provision of a complete service, including constant availability for personal consultation and for participation in field investigations. Similarly, many hospital laboratories make examinations for public health purposes, but their main work is of a different kind. They are interested in the individual case, with a view to its diagnosis and treatment, rather than in the herd from the standpoint of preventive medicine; their methods are those of clinical pathology, consisting largely of work which is not bacteriological in nature. . . .

"The service has not only aimed at a high standard of laboratory work, but has made a special feature of the availability of the staff for personal consultation by Medical Officers of Health and for participation in field inquiries."

All concerned seemed agreed on one thing, and that is, the desirability of taking the laboratory people, whatever field they may work in, closer to the patients and physicians. They were of one mind in condemning so-called "mail order" or "postal" pathology or bacteriology. While advancing this as a counsel of perfection they, at the same time, admitted that we in Canada have different problems demanding some compromise.

Great stress is laid on the importance of what might be called the "intelligence" work of the service. This is based on the reports of all cases of contagious disease which are sent in weekly to the central laboratory and on the results of a systematic classification of the pathogens causing disease in various parts of the country. Not all classification of organisms is carried on in one laboratory; much of it is done by specialists who have had long experience, e.g., the *Salmonella* are typed at Oxford and, before his death with Scott as the result of a bomb, Griffith was classifying the Group A streptococci.

Again to quote from the BULLETIN:

"Most important of all, the organisation of public health laboratories on a national basis is a means of providing an epidemiological intelligence network covering the whole country . . . the source of infection has often to be traced across the areas of many different local authorities."

They have found, as was to be expected, that there are a great many minor outbreaks of infectious disease which formerly would never have been reported. With the provision of capable people to investigate and deal with these episodes, the physicians and medical officers of health are taking advantage of the service. They say that reporting is steadily improving and that a better picture of the extent of contagious diseases is unfolding.

Another interesting point mentioned was the widespread need for education or re-education of hospital staffs and others regarding the meaning of asepsis

and sterilization. The laboratory directors give lectures and demonstrations and generally preach the gospel of better technique in dealing with infections and infected material.

The *modus operandi* of the service is something like this: Notice will come from a physician or a health officer, or possibly from one of the units of the Pathological Laboratory Service, that an outbreak of contagious disease has occurred. The director of the nearest public health laboratory (it may be in the same building as the pathological laboratory making the report) will seek answers to the following questions: What is the infectious agent? How did it reach the patients? Where did it come from? What can be done to prevent a recurrence? Please note that he will do all he can with the resources of his own laboratory. If help is needed, he calls on the director of the central laboratory of the district who, in turn, may refer the problem to the headquarters laboratory. As has already been mentioned, certain special tasks are referred to designated centres, e.g., *Salmonella* typing. The purpose of the pyramidal type of organization is to gather information and *not* to direct the day-to-day activities of the unit directors. Having been trained, they are expected to be self-propelled.

In Scotland the laboratory service situation was better than in England before the war, according to all reports. They maintain (and one heard the same opinion in England) that for years they have had an efficiently functioning public health laboratory service based on the bacteriological departments of the four university medical schools. Only one or two additional laboratories had to be opened in the north to provide the whole country with facilities equivalent to those now enjoyed south of the border. The staffs of each laboratory collaborate with local health officers and with the epidemiologist of the Department of Health of Scotland, Dr. Ian Sutherland, whose headquarters are in Edinburgh. The bacteriologists are prepared to go into the field with the health officers to take specimens, plan investigations, and advise. The whole scheme is rather informal but appears to work. You will note that in this plan the teacher in the medical school is also concerned with the practice of epidemiology. The people operating the service in England and Wales do not favour this arrangement. They feel that a man should do one thing or the other. However, they both acknowledge that the circumstances are not exactly comparable. It will be interesting to watch developments.

There is not time enough, nor is it necessary for our purposes, to go into detail about the Pathological Laboratory Service which has been so ably organized by Dr. Panton for the Ministry of Health. It is the service which concerns itself with the problems of the individual, in contrast to the Public Health Laboratory Service which views the individual as a member of the herd and a potential source of danger to his fellows. Dr. Panton has had to face the same problem of overconcentration of skill and facilities in a few big centres which left large sections of the population, and some large institutions, without adequate service—indeed, in some cases, there was no service. The British system of very powerful local governments had to be dealt with and all sorts of compromises and schemes had

to be devised to meet situations which were different in nearly every locality. The main point to note is that a greatly improved diagnostic laboratory service has been organized which reaches all parts of the country.

A prominent medical man, not connected with the Service, said that the job is being so well done that it will do more than anything else to advance the trend toward socialization of medicine. He explained that the medical profession are discovering how much they missed under the old system, or lack of it.

This very cursory sketch of the British schemes does not begin to do them justice but possibly enough has been said to show you that they possess features worthy of close study. Just to keep this discussion within reasonable bounds, let us confine ourselves to a consideration of the Public Health Laboratory Service in England and Wales. This is not meant to infer that the Pathological Service and the Scottish arrangements do not present interesting features—of course they do. After all, they are national coordinated schemes devised to cover the needs of all the profession and reach all parts of the country. That in itself is something to think about.

At the risk of being accused of minding other people's business, let us examine the main features of the British scheme against the background of present Canadian arrangements. After all, our colleagues of the Provincial services are patient, long-suffering mortals with good solid accomplishments to their credit. They have no need to fear comparison of their work with any other.

To begin with, the British have distributed competent bacteriologists to every part of the country. Their objective is that health officers shall have easy access to laboratories. You will recall that they deplore so-called "postal" bacteriology and pathology. This thought is not new to Canada, as is evidenced by the increasing number of branch laboratories operated by the Provincial services. From conversations with some of the directors one concludes that they are keen to get their experts as close to the scene of action as possible, consistent with serving a large enough population to keep a laboratory reasonably busy. Possibly the handicap of long distances and sparse population could be overcome to some extent by widening the scope of activity of the staffs. To put it another way, if it could be arranged for them to do more for fewer people, then more laboratories could be usefully employed. Surely it is true that, as things are at present, bacteriologists are not being as extensively employed as they might be.

If the branch laboratories could be established in the principal hospital of each community, the director would have more opportunity to help physicians as a consultant. This is a phase of bacteriology that has been badly neglected, except for a few large centres. There may be difficulties in trying to mix clinical and public health bacteriology. Doubtless there are, and quite clearly the British scheme calls for their separation. Nevertheless, with our scarcity of properly trained bacteriologists, we cannot be too particular and if we really believe that the main objective is, as Wilson put it, "to apply bacteriology", then some experimenting with arrangements may be justified. Possibly some of the comment to follow will suggest other ways of putting the branches to better use.

Take the matter of lectures and demonstrations put on by the laboratory directors, for the benefit of hospital staffs and others, to educate and re-educate them regarding asepsis and sterilization. There is no need to underline the importance of this job. Most of you can think of places and people who could benefit from such help. Anyone who has had an opportunity to delve into the mysteries of operating an autoclave knows that sterilization is not a job which can be left to an untrained person. There is also the matter of technique in nurseries, preparation rooms, operating theatres, etc. Very often a great deal is taken for granted in these places and the unwary may be lulled into a false idea that all is well because certain rituals are observed. An experienced bacteriologist could spot weaknesses and almost certainly do a tremendous amount of good in most hospitals. Possibly something should be done by way of legislation to ensure that they have a chance to make this contribution.

Undoubtedly the most striking feature of the British service is their attitude toward epidemiology. They don't mince matters. The bacteriologist is the epidemiologist and he must go into the field, examine all the facts, take his own samples—in short, he must run the investigation. This might be described as applied bacteriology. Some will say that it is epidemiology, others will contend that it is the fact-finding part of epidemiology and that much remains to be done by the statistician. Probably your view will be influenced by your upbringing. Surely there can be no doubt that a large part of the basic data for epidemiological studies can be established only in laboratories and by people well-grounded in a knowledge of the behavior of bacteria and viruses. (Let us not forget the viruses.) Isn't it logical, therefore, to take these experts to the scene of action and give them a chance to know the problem at first hand and select their own material for study? They can determine the samples which might be useful and can see to their proper handling. There can be no doubt that the laboratory worker would be stimulated by this widening of his field of activity.

There remains the job of gathering together and correlating the information elicited by the branch laboratories. In the British scheme this is done at the central laboratory. They also receive the reports of the specialists who have been made responsible for classifying certain referred cultures. This part of the scheme is regarded as being very important. The presence of the experts in every district and the willingness, in fact, eagerness, of the profession and health officers to call in their services, have led to the disclosure of many small outbreaks which hitherto would have gone unreported and unknown to those responsible for disease control. Also, the central office, being in possession of the picture for the whole country, can sometimes suggest possible sources of infection which could not be known to the workers in any single district.

This is very like the task now being performed in the Provinces by divisions of epidemiology with the difference that in the British scheme the duty of securing and verifying the basic data is placed squarely on the district laboratories. While there is room for debate regarding the latter point, we can all agree that the information should be gathered and correlated by someone.

In this connection there is another point we must think about—one which does not arise in Britain. They can think and plan for a fairly compact unit with natural boundaries, whereas, owing to the size of Canada, the peculiar distribution of population and our intimate relationship to the United States, our pattern of disease distribution and spread will, in many cases, be only a part of the full picture, the remainder of which must be sought in the U.S.A. The story of Western equine encephalitis in 1941 illustrates this point.

The fact that we can work out for ourselves only a part of the continental picture need not deter us from making any attempts. There is a lot of east-west traffic in Canada and we can accomplish a good deal by studying events in our own backyard, but we will not do as well as we might unless we cross Provincial boundaries. Probably this is too obvious to need illustration. However, to mention a single event, we had some evidence a few winters ago that a particular Group A streptococcus was being spread through Canada and causing a good many cases of adult scarlet fever. It performed in Halifax, Toronto, and eventually turned up in Ottawa where the date and mode of arrival were pretty definitely fixed and subsequently we were able to plot a neat little curve to represent a neat little outbreak of scarlet fever—all caused by this same wandering germ.

We must learn all we can about such events if we are to advance our knowledge of the biology of disease spread. We must plan on a national basis and we must be very ready to enter into schemes initiated by our friends to the south. A good example is the Committee of the American Public Health Association set up to investigate diphtheria, which should receive our unhesitating support. Not only is this the friendly thing to do, but it is also promoting our own interests.

Enough has been said to indicate my belief that we can learn a good deal by studying the British scheme. However, it is also true that we are faced with different circumstances in Canada and must work out our own plans. They must be made to fit our needs and will be different in each part of the country. While the same basic principles may be applied in every Province, it is probably true that no single pattern will suit all. Similarly, our planning on a national basis must take into account existing institutions, services, and the hard facts of geography. Above all things, we should avoid anything too rigid or cumbersome. A modest start to test our resources seems indicated.

Before closing may I say a few words about the part which we at the Laboratory of Hygiene wish to play in the development of laboratory services in Canada. It might be explained that our work can be classified under two headings:

First, we have certain statutory obligations, that is to say jobs which by law we are required to do. Most of this work relates to the Food and Drugs Act and consists of the examination of food and drugs which require biological methods for the determination of their safety and potency. (By the way, this is a public health job even though this fact is seldom noted.)

Secondly, we have duties which fall to our lot as the public health laboratory of the Department of National Health and Welfare. Some of these jobs are referred to us from other divisions within our own Department, some come from other departments of the Dominion Government, and an increasing number from Provincial and other health agencies. This phase of our work is less well defined than that relating to the Food and Drugs Act but not less important. We are most anxious to develop it and think it holds great promise for the future.

The policy of expanding public health activities was adopted some years ago, as evidenced by the establishment of our branch at Kamloops and the undertaking of bacteriological surveys of shellfish beds. More recently this development has taken the form of aid to Provincial laboratories. They have the responsibility under our constitution for dealing directly with the public and the medical profession. It is our view that we can make a useful contribution by aiding them with special skill and technical resources. A start has been made in this direction. A new section has been set up at Ottawa to aid in solving some of the problems associated with serological tests for syphilis. A virus section is in process of development. These, together with the already established resources of the Laboratory, are at the disposal of the Provinces. It is our policy to integrate this phase of our work with that of the Provincial laboratories along lines to be worked out between us.

Several months ago the Assistant Chief of our laboratory was designated field officer or epidemiologist. Recently, he joined the Army but we hope to resume this scheme just as soon as we have him back. This move was an expression of our belief that the laboratory-trained man, with a laboratory at his disposal, has a useful contribution to make as an epidemiologist.

The Laboratory of Hygiene is a national institution. This means that it belongs to you, and we feel we have a right to ask for your constructive criticism and interest. It also means that we have some measure of responsibility to act as a correlating agency. You may take it as a definite statement of policy that our resources are available for any schemes which show promise of helping in the fuller utilization of the laboratory facilities of Canada.

Medical Intelligence in the United States Army

GAYLORD W. ANDERSON, M.D., DR.P.H.*
Lt. Colonel, M.C., A.U.S.

COLLECTION of military intelligence is one of the oldest adjuncts of warfare, for knowledge of enemy plans and conditions is of utmost importance both in over-all planning and in immediate operations. The operation of such intelligence services must obviously be surrounded by an aura of secrecy and therefore does not constitute a topic of public discussion. There is, however, one phase of intelligence which has been openly discussed in public print and which is of interest to a public health group—namely, medical intelligence. By this is meant the collection, analysis and dissemination of all possible information regarding medical, health and sanitary problems and practices of foreign areas. It is certain phases of this problem that I am privileged to discuss this afternoon.

Since time immemorial disease has been the inevitable concomitant of war. Plague and pestilence have sat as the uninvited and unnoticed guests at the military council table, ready to upset the best-laid plans of the generals. There has never been a war in which disease has failed to cause more casualties than have bullets or shells; in all previous wars it has exacted a heavier toll of life, as well as being a more important cause of military ineffectiveness. Malaria, typhus and cholera have decided the course of battle and the destiny of nations, sometimes because man was incapable of combating their ravages, at other times because he failed to read correctly the pages of history and to make allowances for the inevitable counter-attack from these invisible and politically neutral enemies. Nor has disease confined its impartial ravages to the military forces. Too often the civilian population of areas ravaged by war has been a more pitiful victim of disease than the military forces. Their homes destroyed, their domestic economy thrown off balance, they themselves often forced to the role of refugees, deprived of shelter, food and medical care—civilian populations have been decimated by the ravages of disease.

It is no secret that the current war has produced situations in which disease has once more threatened to take its former role as a vital and determining factor in the success or failure of military operations. So far as the United States was concerned, the last war produced few unusual or novel disease-prevention problems. Our military operations were confined to areas with a sanitary culture not greatly dissimilar from that of our own country. Our allies had had almost three years of experience in the zone through which we were to fight and could share with us the sanitary lessons they had learned. In the present war the situation is entirely different. We have been forced to do battle in, or maintain our supply lines through, some of the most disease-ridden areas of the world. Had we deliberately selected the zones in which

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**Director, Medical Intelligence Division, Preventive Medicine Service, Office of The Surgeon General, U.S. Army.*

disease-prevention problems would be the greatest and the most varied, we would have departed but little from the pattern cut out for us by our enemies. We have had to face the problems of the humid steaming jungle where disease has for centuries successfully barred the effective entry of civilization. We have had to meet the baked and arid desert and the frozen north. Diseases unknown to us except as museum specimens or as textbook descriptions have become problems of vital everyday importance. This is truly a global war in which our problems of disease prevention have been as varied as has been the terrain or the climate of our far-flung battle-front.

Medical Intelligence, as developed in the Preventive Medicine Service of the Office of the Surgeon General of the United States Army, has had as its major function the collection of data regarding the health problems and facilities of these areas where military forces might be stationed or operating. The basic purpose of this intelligence has been to determine the disease hazards to which our troops might be exposed so that adequate provisions might be made to combat these hazards. The Medical Intelligence Division had its inception in the era of hemispheric defense when we were faced with the problem of stationing garrisons in the defense bases made available to us in Canada, the West Indies and Latin America. The proper equipping of such forces depended on detailed knowledge of the hazards to which they were to be exposed and of local practice and facilities to meet these problems. Because a friendly garrison force has closer relations with the civil population than does a conquering combat army, exact knowledge of local conditions in a friendly cobelligerent nation is of as great importance as detailed information about a hostile area.

The sudden expansion of our military problem from one of hemispheric defense to one of active combat on a truly global front has meant that Medical Intelligence has enlarged its sphere of interest to cover all parts of the world outside of the continental United States. As no one could foresee the exact future pattern of war, the Medical Intelligence Division has operated on the theory that it must be prepared to furnish information about any area at any time, rather than waiting to assemble data in a hasty scramble after the need has arisen. To this end, all areas have been or are being studied even though the immediate need for certain data is not always apparent. This policy of global coverage has yielded rich dividends.

There is no limit to the type of medical information that may be of potential value to a military force. In its earliest stages Medical Intelligence confined itself to rather simple evaluations of the major and peculiar disease hazards of an area, but as experience has been obtained and lessons learned as to types of information desired, the coverage has become constantly broader. For example, the problem of administration of civil affairs has introduced a need for details far beyond those required by a task force. Similarly the medical problems that will arise in the postwar rehabilitation will be such as to require very complete data on prewar and current medical needs and facilities. The result of this broadened horizon has been that the current surveys prepared by Medical Intelligence have become more comprehensive documents than were the original studies.

A typical survey is broken down into several components. After a brief

introduction describing the geographical features essential to an understanding of the medical problems, there is a discussion of the health organization of the country. Wherever a military force is located, whether on a friendly or a belligerent basis, the surgeon must be familiar with the public health structure of the community for he will of necessity have many dealings with local officials.

A second section deals with environmental factors. Under this heading come such topics as water supply, waste disposal, vectors of disease, dangerous and pestiferous animal life, problems of food supply and sanitation and even a consideration of flora of potential medical significance. The need for exact and detailed information about water supplies is self-evident. In the United States Army the problem of water supply is divided between the Corps of Engineers and the Medical Department, the former being responsible for the furnishing of an adequate quantity, the latter for the sanitary quality. A medical intelligence survey must therefore concern itself primarily with the problem of the safety of the supply and of local facilities to guarantee this safety: character of sources, degrees of pollution, facilities for treatment and purification, and hazards of storage and distribution—all of these are matters about which detailed information is essential. Similar data are essential regarding waste disposal problems and practices.

Full knowledge of local vectors of disease is a matter of major concern, especially in tropical and subtropical areas where insect-borne diseases are of such importance. One of the major recent developments in our approach to the control of such diseases has been our appreciation for the need of species control. We have come to learn the need for exact entomological knowledge as a condition precedent to the institution of an intelligent control program. Today we appreciate the fact that programs that fail to take cognizance of such knowledge may be not only wasteful but may actually be harmful in that they increase the breeding of local vectors. The drainage of swamps is of no value in malaria control if the local vector breeds in running streams; clearing of timber and underbrush, effective in the control of shade-breeding mosquitoes, may actually increase the number of mosquitoes if the local vector breeds in sunlight, as is the case in certain very important areas. The important local vectors in closely related areas may be quite different in their habits and breeding requirements. It is therefore of utmost importance to have as detailed information as possible regarding the distribution, occurrence and habits of insects and other arthropods that may serve as vectors of disease to man. The importance of such diseases as malaria, filariasis, dengue and scrub typhus bespeaks the need for having detailed information in the hands of the medical officers of any force before arrival in a new area. In some areas information regarding pest mosquitoes and flies is of vital concern as these may be so numerous as to constitute a real hazard even though they do not transmit specific disease.

A third section of these reports deals with medical and hospital facilities. Exact knowledge as to the quantity and quality of medical care of the civil population is of military concern, for even in friendly areas a military force obtains much labor assistance from local civilians. The need for such information is obvious to an occupying force charged with care of health of a con-

quered area. Among the items of concern under this heading are the number and distribution of medical personnel such as physicians, dentists, veterinarians, nurses, midwives, and local cultists; location and equipment of hospitals and of laboratories; sources of drugs, biologicals and medical supplies; and activities of social agencies.

The fourth topic is that of diseases of the area under consideration. Mere enumeration of diseases to be encountered is of little value. The surgeon of the task force must be informed as to the relative importance of each disease, its seasonal occurrence, geographic and social distribution, local vectors, extra measures locally practised—in brief, of all the epidemiological factors governing local occurrence of the disease in question. Relative importance must be evaluated from both the military and civil viewpoint, for these are not by any means identical. Thus typhoid fever may be a major health problem to the civil population yet of only minor import to an immunized military force disciplined with respect to sanitary procedures. Conversely dengue may, from its very endemicity, be a minor civil problem, yet be a major problem to a task force coming from a dengue-free area. All of these factors must be evaluated in the light of what can be learned regarding factors governing the local occurrence of a disease.

A final section of such surveys contains specific suggestions as to precautions to be observed locally to safeguard the health of troops. Here are brought together the conclusions derived from study of the health problems of the area. These recommendations cover specific measures over and above those procedures which are routine for any military force wherever located.

I have often been asked as to the sources of all this information and the type of persons employed to assemble and analyze it. We have attempted so far as possible to utilize personnel with a first-hand acquaintance with the area in question or at least a reading knowledge of the medical literature of the country. A staff capable of handling medical literature in over fifteen languages has been the backbone of such work. When dealing with countries with which they were not personally acquainted they have usually had the benefit of counsel and advice of those who were so acquainted. They have scoured the libraries in search of information, have talked with persons who had lived in these areas. Such governmental agencies as the Smithsonian Institute and the Bureau of Entomology and Plant Quarantine of the Department of Agriculture have furnished invaluable information regarding insect distribution. Governments in exile have virtually opened their files. Briefly, no plausible source of information has been neglected and no person or agency likely to have information about such areas has refused to make such completely available. Everything has been grist that has come to the mill.

It would be pleasant to be able to appraise the value of this type of intelligence but that must rest with the historian. From the many demands for information one may infer, however, that Medical Intelligence serves a useful purpose. Surveys of foreign areas have been made available for training purposes in this country, for orientation of forces leaving the country, for briefing of forces in the theatres. They have been furnished freely to cobelligerent nations whose military forces face the same problems as do ours. They have

been made made available to governmental agencies concerned with postwar planning and relief. In fact, they have filled a need for detailed information by a great variety of public agencies other than the military. It is our hope that back of all this immediate demand, which has been very gratifying to those of us engaged in this program, history will record that Medical Intelgence through pointing out the health hazards and needs of foreign shores may have played some small part in reducing the disease casualties of this war and of hastening the control of disease in the period of postwar reconstruction.

Errors in Applying Nutrient Allowances to Dietary Surveys or Food Policies

L. B. PETT, PH.D., M.D.
Director, Division of Nutrition
Department of National Health and Welfare
Ottawa, Canada

INNUMERABLE combinations of individual foodstuffs are capable of providing optimal nutrition. This is fortunate because it permits adaptation to the wide variations observed around the world in dietary habits, in agricultural possibilities, and in food composition. But the situation demands a standard of some kind for measuring the contribution of different foodstuffs to the total. Statements of man's needs in terms of calories, protein, carbohydrate, fat, minerals and vitamins are, therefore, widely used and all foods are reduced to these terms.

Such standards or statements have been devised from time to time by various authoritative bodies. They differ in detail and require modification at intervals in the light of advancing research. The most detailed of such tables is that of the United States National Research Council drawn up in 1941-42. These "Recommended Dietary Allowances" have been widely used, and have specifically been adopted "for the sake of uniformity at the present time", by the Canadian Council on Nutrition. Although now widely used throughout the world as a reference point, they often receive modification (for example, see the First Report of the National Nutrition Council of the Union of South Africa).

STANDARDS AND NATIONAL FOOD POLICIES

The Sectional Report of the United Nations Conference on Food and Agriculture says:

"It follows that one of the important uses of dietary standards is in the guidance of agricultural and economic policies concerned with improving diet and health of populations. Such standards provide a yardstick which can be applied not only on a national basis, but also on a family basis, or in

improving the diet of limited groups, such as residents in institutions. Finally, they can be applied to the world as a whole."

When attempts are made (and they are now being made) to interpret such standards in terms of foods and in terms of national and international food requirements and agricultural policies, then serious errors may result. These errors are of two kinds:

1. One is concerned with the problem of setting a standard for optimal nutrition and the question as to whether the present "Recommended Dietary Allowances" are too high in some respects. It is generally agreed that an intake of each nutrient above the level needed to prevent detectable pathology is desirable, but there is no agreement and there seem to be insufficient data to decide how much above the minimum level the standard should be placed.

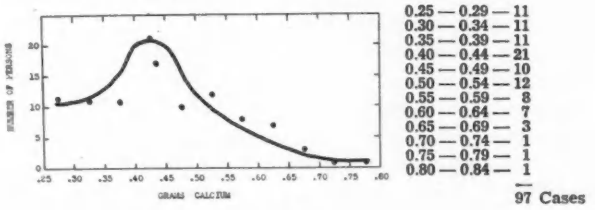
2. The second error is presented in this paper. Whether we consider the level protecting against disease or a higher level, there is a range of values around that level needed to satisfy the individual variation in any normal population.

It has been said (United States National Research Council Bulletin No. 109, page 19) that these Allowances are averages, but if this be true then they are averages of data not published in the scientific literature. Whether at a minimal or an optimal level, the figure can be applied to population groups only if it is *known* to be an average, and if there are some indications of the range of individual variations around it; half the people in any group need less than the average.

GRAPH 1

VARIATION IN THE ADULT HUMAN REQUIREMENTS FOR PHYSIOLOGICAL BALANCE OF *Calcium* IN 97 PEOPLE

(Adapted from Sherman, J.B.C. 1920)



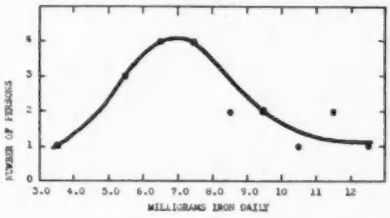
INDIVIDUAL VARIATIONS—DISTRIBUTION CURVES

Practically all physiological experiments show a variation in individual susceptibility or requirements, and these variations fall on some kind of distribution curve grouped around the mean, median and mode. For example, out of 97 persons a balance between intake and output of calcium was achieved for 22 persons with less than 0.35 grams daily, while 54 persons were in balance with between 0.35 and 0.55 grams calcium daily, and three of the people needed over 0.70 grams daily. (See Graph 1.) The mean or average, for this group, and the mode (i.e. the most common individual balance requirement found) are between 0.40 and 0.45 grams calcium daily.

However, in order to allow for unknown factors the Recommended Allowance in our standard is 0.8 grams. It is obvious from this evidence, which is the best available, that only a small fraction of a population group apparently need this much, and that nearly half of the group could be in calcium balance with a calcium intake of only 50 per cent of our standard.

GRAPH 2

VARIATION IN THE ADULT HUMAN REQUIREMENTS FOR PHYSIOLOGICAL BALANCE OF IRON IN 20 PEOPLE
(Adapted from Sherman, 1941)



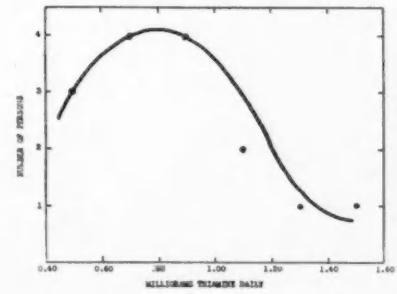
3.0 — 3.9 — 1
4.0 — 4.9 — 0
5.0 — 5.9 — 3
6.0 — 6.9 — 4
7.0 — 7.9 — 4
8.0 — 8.9 — 2
9.0 — 9.9 — 2
10.0 — 10.9 — 1
11.0 — 11.9 — 2
12.0 — 12.9 — 1

20 Cases

Clearly, too, a calculation of agricultural production needed to supply every person in a nation or in the world with 0.8 grams calcium daily is grossly overestimating the actual amount needed unless the use of this figure is taken as a crude way of allowing for losses on storage and preparation and for uneven distribution. Such allowances, based on a mean or mode, would be more scientific. For small groups this may not matter, but for millions of people it comes to represent thousands of tons of food.

GRAPH 3

VARIATION IN THE ADULT HUMAN REQUIREMENTS FOR *Thiamine* IN 15 PEOPLE
(Adapted from various sources)



0.40 — 0.59 — 3
0.60 — 0.79 — 4
0.80 — 0.99 — 4
1.00 — 1.19 — 2
1.20 — 1.39 — 1
1.40 — 1.59 — 1

15 Cases

It is true that there is no easy way of seeing that people having high requirements get large amounts, and people having low requirements get small amounts. This is really an individual medical problem, and one which it would not be easy to answer for many nutrients. In dealing with large numbers of people, however, it would seem better to calculate total food

needed on a mean or a mode, plus allowances for losses on storage and processing, and for uneven distribution. Instead of this, calculations are being made based on these high figures for nutrient requirements, even though many in a population group might need only one-third of this amount.

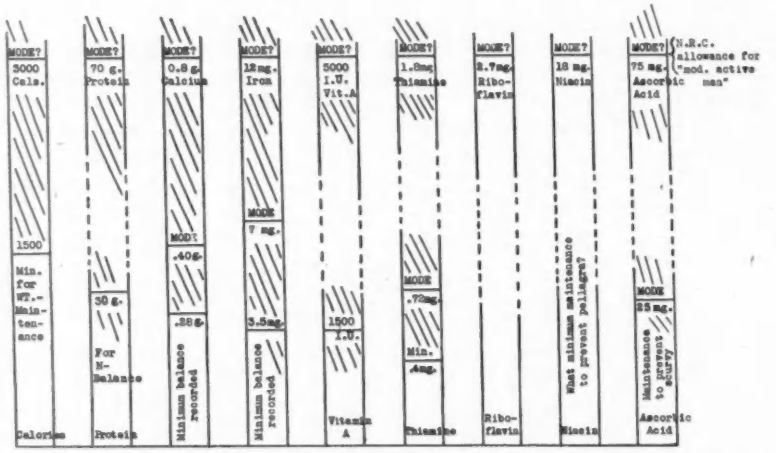
Errors in Dietary Surveys

Standards are also used as points of reference for dietary surveys. These are being widely quoted at the present time (National Research Council Bulletin No. 109, U.S.A.). A statement that 30 per cent or even 60 per cent of a given group of people were eating less than 50 per cent of the Recom-

THE BASES AND MEANINGS OF FIGURES FOR NUTRIENT REQUIREMENTS

1. How far is the Level for Optimal Nutrition from the Level Protecting Against Disease?
2. At any Level there is a Range of Individual Requirements.

THIS RANGE NEEDS CONSIDERATION IN INTERPRETING DIETARY SURVEYS AND IN CALCULATING NATIONAL FOOD SUPPLIES



Cross lines indicate the range of distribution for a normal population group, or the extent to which individual requirements vary from the average (or from the mode). These values are not known with accuracy but it is certain that some people in a group need less than, and some need more than the mode.

mended Allowance of 0.8 grams calcium daily, or than the recommended 12 milligrams of iron daily, or than the 1.8 milligrams thiamine daily *might be the correct result for an optimally nourished population*. Unfortunately, there has not been sufficient study of nutrient requirements in terms of individual variation to draw accurate curves for any of the nutrients, but the meaning may be illustrated by Graphs 1, 2 and 3. An attempt has been made to get the best data possible from the literature but it is admittedly not entirely satisfactory. Such curves are needed for every figure in the table of

recommended dietary allowances and the much-needed research on human dietary requirements should be expressed in this way if it is to be safely applied in the public health field which deals with population groups.

The bar chart further illustrates the problems of the range of variation around any level that is chosen, and of the difference between minimal and optimal levels.

Conclusions

Neither the most satisfactory level of intake nor the optimal retention of any nutrient at any age or stage of man's development is known with certainty. Much of the information available is not presented in a form which can be given a proper biological interpretation. This biological interpretation is essential if nutrition is to be applied properly to population groups (public health groups) either in dietary studies or in calculating national and world requirements of foods. Research should be directed along these lines.

Current efforts to plan national or international food policies for the promotion of freedom from want and current interpretations of dietary surveys may lead to serious errors unless account is taken of our lack of knowledge on how to apply "standards" or "requirements" for various nutrients to population groups.

Canadian Journal of Public Health

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THE ROCKEFELLER FOUNDATION IN CANADA

PUBLIC health workers throughout Canada will be pleased to learn that the International Health Division of The Rockefeller Foundation has appointed one of its most senior members, Dr. William A. McIntosh, to give full time to the development of its program in Canada, with an office in Toronto.*

A colleague of Dr. John A. Ferrell, who recently retired as Associate Director of the International Health Division, Dr. McIntosh is well known to the Federal and Provincial health authorities and to many local health officers. He has been closely in touch with the development of public health in the Dominion, particularly the provision of full-time local health services in six of the Provinces, the organization of a Metropolitan Health Area for Vancouver, and the conduct of studies in the Maritime Provinces where The Rockefeller Foundation has assisted greatly in the development of Dalhousie University as a medical centre and in the establishing of the Cape Breton Island Health Unit. A survey of the public health needs of Halifax, conducted by Dr. Bruce Wilson and Dr. McIntosh, was implemented by the City of Halifax and the Provincial Government, with the generous participation of The Foundation.

The first course in Canada leading to the Diploma in Public Health was given in the University of Toronto in 1912, and in the following years 37 physicians received the Diploma. In 1924, expansion of the work into an organized School was made possible by The Rockefeller Foundation and in 1927 the School of Hygiene was formally opened. Thus The Foundation has had a major part in one of the most important contributions to public health in Canada. Since 1927, 263 physicians have undertaken post-graduate training in public health and it is significant that before the war more than 90 per cent of these were engaged in administrative health work in Canada. Of great importance also has been the support extended by The Foundation to the Schools of Nursing in the University of Toronto and the University of British Columbia for the training of nurses in public health. One hundred and sixty-six fellowships for post-graduate training in public health have been granted by The Foundation to physicians and nurses from all the Provinces. The progress in the organization

**The Rockefeller Foundation, International Health Division, 150 College Street, Toronto 5, Canada.*

of public health in Canada has been due very largely to the leadership of those who have had this post-graduate instruction, and many could not have undertaken such study if fellowship grants had not been provided. Travel grants have been made available also to members of health departments and the teaching departments of universities.

The development of health units in Canada was the direct result of the demonstration by the International Health Division of such services in the United States, and the financial assistance given in the early period of their establishment. Financial aid has also been given to numerous other projects, including field studies. With the participation of The Foundation, surveys of the possible occurrence of sylvatic plague, Rocky Mountain spotted fever and tularaemia have been conducted in Western Canada by the Federal and Provincial Governments. In Manitoba several studies have been supported by The Foundation.

These extensive undertakings in Canadian public health have represented a financial investment of several million dollars. In addition, The Rockefeller Foundation has made large contributions towards capital expenditures by Canadian universities for medical colleges and in other fields of education.

Appreciation of the contribution made by The Rockefeller Foundation to the development of public health in Canada during the many years in which he visited the Dominion as their representative in the field of health was expressed to Dr. John A. Ferrell on the occasion of the Association's annual meeting in Toronto last November. The action of The Rockefeller Foundation in arranging for Dr. McIntosh to give his full time to the study of Canadian needs will be welcomed in Canada and will be a source of added strength to the public health movement. The establishing of the Canadian office will permit a more intimate contact between public health workers in Canada and The Foundation. The International Health Division is keenly interested in projects undertaken in various Provinces to solve special problems, to develop new methods, and to pioneer in new fields of public health endeavour. It is desired to make health programs more effective through carefully planned studies and field trial. The Health Division is truly international in its vision and work. It is our hope that Canada in turn may be able to contribute to the advancement of international public health. The Canadian Public Health Association extends to Dr. McIntosh a most cordial welcome.

BERNARD THOMAS McGHIE, LL.D., M.D.

DOCTOR B. T. McGHIE, whose untimely death occurred on January 20th, was widely known as one of Canada's most able health administrators and an outstanding authority on psychiatry. Since the first world war, in which he served with the Royal Army Medical Corps overseas, he had worked for the advancement of public health in his native Province, Ontario.

Dr. McGhie was born in Elgin, Leeds County, in 1889 and graduated in medicine from Queen's University in 1917. On his return from overseas, where

he had shown an aptitude for hospital administration, he was appointed director of the Westminister Hospital, a Federal mental institution at London, Ontario. He remained there from 1920 to 1927, serving also as Associate Professor of Mental Hygiene in the University of Western Ontario. After a period as Superintendent of the Ontario Hospital at Orillia, recognition of his ability brought him, in 1930, the post of Director of Mental Hospitals for the Province of Ontario. In 1933 he was appointed Deputy Minister of Health for the Province and two years later became Deputy Minister of Health and Hospitals, assuming the administration of the various divisions of the steadily expanding Department of Health in addition to continuing his direction of the hospital services. His concern for the preventive aspects of mental illness, in which he pioneered, made the transition from administrative medicine to public health relatively easy. His enthusiasm and clarity of thought, coupled with his administrative experience, earned him prompt recognition in this new field.

In recent years, Dr. McGhie had taken a leading part in the development of plans for the extension of full-time health services in Ontario and for the active integration of curative and preventive medicine in such services. He was a generous supporter of any organization that had for its objective the advancement of public health, and he had contributed much to the Canadian Public Health Association, which he served last year as President. It will be recalled that his presidential address at the November meeting appeared in this Journal only two months ago. An outstanding and loyal graduate of Queen's University, he was honoured with the degree of LL.D. in 1943.

Laboratory Supplement

ABSTRACTS OF PAPERS PRESENTED AT THE THIRTEENTH ANNUAL CHRISTMAS MEETING OF THE LABORATORY SECTION, CANADIAN PUBLIC HEALTH ASSOCIATION, HELD IN THE ROYAL YORK HOTEL, TORONTO, DECEMBER 18 AND 19, 1944

The Blood Picture in Benzene Poisoning. M. C. DINBERG, Division of Laboratories, Department of Health of Ontario, Toronto.

THE re-introduction of benzene and allied products in war-time manufacturing increases the possibility of acute and chronic benzene poisoning. In acute poisoning the blood picture shows no significant changes because of the rapidity of the process. In the chronic form, however, there are varying degrees of disturbance of haematopoiesis. The bone marrow reacts in characteristic manner depending upon the degree of exposure, duration of exposure, and individual susceptibility. The bone marrow reactions vary from extreme aplasia to extensive hyperplasia and, perhaps, to leukemoid status. Leukopenia, commonly accepted as important infallible evidence of benzene poisoning, may be entirely absent. Frequent blood picture records (modified haemograms) should be maintained on all persons working with benzene. Prevention depends upon knowledge of employer and employee that benzene is being used.

Acute Methyl Alcohol Poisoning—Observations in Thirty Cases. ARNOLD BRANCH and D. J. TONNING, Bureau of Laboratories, Province of New Brunswick, and the Saint John General Hospital.

EVIDENCE is accumulating which would suggest that the symptoms and pathological lesions of acute methyl alcohol poisoning are due to a degeneration of nerves, including those of the retina, caused by the acidosis of retained lactic acid. Dramatic clinical improvement, including alleviation of eye symptoms, follows the injection of alkali in sufficient amount to restore the CO_2 combining power of the blood to normal. Other adjuvant measures such as washing out the stomach are also recommended, and shading of the eyes and administration of thiamine chloride where eye symptoms are exhibited. It is also likely that 50 per cent glucose solution and concentrated serum followed by normal saline intravenously are of assistance in increasing elimination. Examination of the blood for non-protein nitrogen, uric acid and creatinine showed normal values which led us to believe that there was no impaired kidney function. Similarly, Van den Bergh and Icteric indices and estimations of clotting and bleeding time were within normal limits, excluding extensive damage to the liver and haematopoietic system (see table). Our epidemic is peculiar in that with the treatment of the acidosis there have been practically no residual eye lesions in the recovered cases.

LABORATORY FINDINGS IN ACUTE METHYL ALCOHOL POISONING

Blood	H.E.	A.C.	W.C.	J.N.	J.H.	C.G.	L.D.*
CO_2 Combining Power							
Before Treatment	13	16	35	51	48	65	55
After Treatment	41	49	64	59	61	64	..
Non Protein Nitrogen	37	38	34	41	38	41	39
Urea Nitrogen	11	13	10	14	11	14	12
Uric Acid	5	4	3	3	1	2	1.7
Creatinine	1.4	1.3	0.8	1.4	3.2	1.0	1.3
Alcohol	.124%	.13%	.12%	.117%	.10%	.014%	.24%
Total Proteins			4.3			4.9	
Albumin			4.1			4.1	
Icterus Index			9.2			6.2	

*Ethyl Alcohol Poisoning for comparison.

	H.E.	A.C.	W.C.	J.N.	J.H.	C.G.	L.D.
Van den Bergh							
Indirect			.22			.22	
Direct			.27			.44	
Chlorides					467		
Cholesterol					145		
Haemoglobin	88%						
Red Cell Volume	49	52	50	47		56	55
Clotting Time	4	3	3	3½		3½	3½
Bleeding Time	1½	2	3	2		1	3
Lactic Acid					74.3		
Formic Acid Urine					6.2		
Spinal Fluid		Cells 3 Normal					
Ethyl Alcohol given		Yes					
Methanol Stomach	0		+		±	+	

Serological Differences in Strains of Salmonella Pullorum. RONALD GWATKIN and ERIC W. BOND, Division of Animal Pathology, Science Service, Dominion Department of Agriculture, Hull, Quebec.

THE whole blood test on 294 chicks tested 5 to 6 weeks after exposure by mouth to variant strains of *S. pullorum* showed 191 positive with variant antigen. Twenty of these were positive with regular type antigen. If positive and questionable reactions had been grouped, as is done in routine testing, 185 birds would have been missed by the regular antigen (approximately 89 per cent). A second test of these birds was carried out between the 80th and 102nd days by whole blood and tube tests. The regular antigen failed to detect 74 samples classed as positive or questionable by the variant type (68.5 per cent).

The recovery of the organism from chicks which had died of pullorum disease, and from the ovary of many that died later from coccidial infection and other causes, afforded proof of the specificity of the variant strain reactions.

This was further supported by the absence of reactions in known negative birds. In 815 tests, only two birds would have been removed (0.24 per cent).

Among the miscellaneous samples tested, 63 chicks injected with the regular strains showed a preponderance of variant agglutinins 6 days after injection, but two months later, after further injections of the same organisms, the predominating agglutinins were of the regular type.

The experiment from which most of these data were drawn is still in the early stages but there is no doubt that, as contended by Younie, there is a marked difference in antigenicity of the strains, and it is clear that neither type would be satisfactory for detecting the heterologous agglutinins.

Food Poisoning due to Salmonella Newport in a General Hospital in a City in Ontario. W. B. MCCLURE and VERA CROSSLEY, Director of Laboratories, Department of Health of Ontario, Toronto.

AN outbreak of food poisoning due to Salmonella newport occurred in a general hospital in a city of Ontario. Thirty-five per cent of the student nurses, 55 per cent of the kitchen staff, and about 30 per cent of the patients were attacked. Cold beef served at the evening meal was the suspected food. The hospital chef and one of the kitchen help were not attacked. Salmonella newport was found in their stools on the tenth day but became negative sometime between the tenth and the twenty-sixth day.

An Antibiotic Substance Active against Mycobacterium Tuberculosis. IGOR N. ASHESHOV and FRIEDA STRELITZ, Faculty of Medicine, The University of Western Ontario, London.

AN antibiotic substance active against *M. tuberculosis* was isolated from the meta-

bolites as well as from the mould itself of a strain of *Aspergillus fumigatus*. The partially purified substance showed bacteriostatic action against staphylococci in 1:700,000 dilution and against *M. tuberculosis* BCG in 1:1,400,000 dilution. Bactericidal activity against tubercle bacilli was equal to or slightly lower than its anti-staphylococcal activity. Bacteriostatic action against *B. coli* is believed to be due to a different substance present in the crude preparation.

The substance active against tubercle bacilli may be similar to fumigacin or helvolic acid, though some of its properties seem to indicate that the two antibiotics are not identical.

Some other, as yet unidentified, moulds now under investigation were found to produce substances active against tubercle bacilli.

Blood Meal of the Mosquito. W. A. RIDDELL and ELSPETH MCNELLY, Division of Laboratories, Department of Public Health of Saskatchewan, and J. G. REMPEL, Regina College, Regina.

As a result of the outbreak of human encephalomyelitis in 1941 which caused 543 recorded cases in Saskatchewan and resulted in 44 deaths, a study of the blood sucking insects was undertaken in this area to determine possible vectors. While there are about 25 species of mosquitoes found in Saskatchewan, only 8 are abundant in the southern part where the outbreak occurred. Present information indicates that of these, *Aedes vexans*, *A. dorsalis*, *A. nigromaculis*, *Culiseta inornata*, and *Culex tarsalis* may transmit the virus under laboratory conditions. Furthermore, the virus has been isolated repeatedly from specimens of *C. tarsalis* and *C. inornata* collected in nature.

Gorged specimens were collected and indentified in the field and the blood meal was pressed out on to filter paper. The droplets were suitably labelled and forwarded to the laboratory. The droplets were extracted with normal saline and tested by means of the precipitin test against human, equine, bovine and avian antisera. These antisera were prepared using rabbits and were chosen because of the preponderance of these hosts in this area.

The results given in tables 1 and 2 include only the species collected in significant numbers.

TABLE 1

PERCENTAGE OF MOSQUITOES FEEDING UPON VARIOUS HOSTS

	Human	*Equine*	*Bovine*	*Avian*	*No Reaction*	*No. of Specimens*
A. spencerii	33.3	50.3	29.9	25.0	3.7	643
A. campestris	34.7	34.6	28.9	40.5	11.7	69
A. flavescens	35.7	47.8	23.2	24.5	10.0	207
A. vexans	38.5	36.0	27.3	22.0	5.7	139
A. nigromaculis	39.3	36.3	36.3	21.2	3.0	33
A. dorsalis	45.4	43.1	19.2	22.0	1.8	160

TABLE 2

PERCENTAGE OF SINGLE AND MULTIPLE FEEDINGS

	Single	*Multiple*	*No Reaction*	*No. of Specimens*
A. spencerii	56.2	40.1	3.7	643
A. campestris	46.5	41.8	11.7	69
A. flavescens	50.6	39.4	10.0	207
A. vexans	67.7	26.6	5.7	139
A. nigromaculis	63.9	33.1	3.0	33
A. dorsalis	67.3	30.9	1.8	160

It is evident that these insects are promiscuous feeders and if they are interrupted will indulge in multiple feeding using either the same host or hosts of different species from the original. This indicates that at least *A. vexans*, *A. nigromaculis* and *A. dorsalis* might act as vectors for encephalomyelitis. Further information is required on other species as to their feeding habits and their ability to harbour the virus.

Observations on the Bacteriology of Diphtheria in Halifax. E. T. BYNOE and DOROTHY E. HELMER, Laboratory of Hygiene, Department of National Health and Welfare, Ottawa.

BACTERIOLOGICAL studies were conducted on 125 cases with a provisional diagnosis of diphtheria which occurred in Halifax (November 1943 to January 1944). Ninety-four of these were confirmed by culture. *Gravis* was the predominant type of diphtheria bacillus; 64 cases were due to *gravis*, 28 to *intermedius*, and 2 to *mitis* bacilli. Observations were made on the bacterial flora associated with the diphtheria bacillus in the nose and throat of the diphtheria case, with particular reference to the haemolytic streptococcus. In general, the same types of organisms were found in the diphtheria case as in the normal healthy individual. Group A haemolytic streptococci were found in 16.6 per cent of the cases, and the same serological types were present as were prevalent in scarlet fever and streptoccoccus throats in the hospital at the time. There appeared to be no significant difference between the clinical severity of the *gravis* and the *intermedius* infections; *gravis* was the predominant strain in both the severe and the mild cases. The great majority of the *gravis* strains from both the active cases and carriers were serologically typed as type 1 (Robinson and Peney). This was the same type which was predominant at the time the epidemic in Halifax started in 1940. The different strains of diphtheria bacilli were very stable; no changes appeared in the cultural, biochemical or serological characteristics of these strains during their existence in the human host or in the laboratory. In a carrier survey of 1,350 school children, 25 (1.8 per cent) were found to be carrying virulent *C. diphtheriae*, 9 (36 per cent) of which were *mitis* and 14 (56 per cent) *gravis*.

Some Observations on Diphtheria in the Immunized. J. GIBBARD, E. T. BYNOE, and R. J. GIBBONS, Laboratory of Hygiene, Department of National Health and Welfare, Ottawa.

IN a series of 94 cases of diphtheria investigated, 23 had received a complete series (3) of injections with fluid toxoid more than 3 months before and within 3 years of the disease. The distribution of the different types of *C. diphtheriae* in the series is given, and the antitoxin levels in a number of the cases at the beginning of the disease and several months later were determined. Thirty-three per cent of those tested on admission to hospital had more than 1/250 unit of antitoxin per cc. of their serum, a level higher than that commonly considered necessary to give a negative Schick reaction. While there were 5 deaths and 14 severely ill cases in the series, there were no deaths among the inoculated and none was severely ill.

Equine Encephalomyelitis. I. Complement Fixing Antibodies in Human Sera before and after Vaccination. L. M. HEATH, Division of Animal Pathology, Science Service, Dominion Department of Agriculture, Hull, Quebec.

MOUSE-brain antigen which was employed by Casals and Palacios in the complement fixation test for the diagnosis of equine encephalomyelitis infection in man and implied by them to be specific for this purpose was found incapable of differentiating specificity between pre- and post-vaccination sera. In comparable complement fixation tests of 267 samples of pre- and 286 samples of post-vaccination sera, using an antigen prepared after their method and, as controls, two other antigens prepared from virus-infected guinea-pig brain and virus-infected amniotic-allantoic fluid from chick embryos respectively, only a difference of 7 per cent in positive reactions resulted between the two types of sera with the antigen prepared by the method of the above authors and less than half (45 per cent) of the post-vaccination sera reacted. Agreement between the results obtained with the three antigens used was poor. A condensation of the results is given in table 1.

TABLE 1

Type of Serum	No. Tested	Reacting to Antigens					
		Casals & Palacios		Infected G.P. Brain		Infected Am.-all. Fluid	
		No.	%	No.	%	No.	%
Pre-vaccination.....	267	96	38	42	17	6	2
Post-vaccination....	286	129	45	67	23	40	13

Likewise in comparable results obtained from 98 samples of pre- and 138 samples of post-vaccination sera which had reacted positively to one or other of the three specific antigens originally, when retested with the three antigens (specific) and corresponding antigens free of virus (non-specific) there was evidence of variation from the original results and marked non-specificity, as the condensed results, recorded in table 2, will show.

TABLE 2

Type of Sera Reacting in Original Tests to All Antigens	No. Retested	Reacting to Antigens											
		Casals & Palacios				G.P. Brain				Am.-all. Fluid			
		Specific		Non-Specific		Specific		Non-Specific		Specific		Non-Specific	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Pre-vaccination.....	98	69	67	36	35	37	36	45	44	6	5	1	0.9
Post-vaccination....	138	97	70	51	37	55	40	73	53	35	25	4	2

That the reactions obtained were not wholly dependent on the virus content of the antigens is seen in the fact that the antigen prepared from infected amniotic-allantoic fluids of chick embryos, containing one hundred thousand times more virus than the mouse brain antigen of Casals and Palacios, indicated less than one third per cent of reactors (45 per cent to 13 per cent, table 1) in comparable tests. This finding precludes the use of infected amniotic-allantoic fluid as an antigen for determining antibodies in post-vaccination sera, even though variation in repeated tests and non-specificity indicated were less marked than either of the antigens prepared from infected brain tissue.

Equine Encephalomyelitis. II. Comparison of Neutralizing and Complement Fixation Antibodies in Human Sera. L. M. HEATH, Division of Animal Pathology, Science Service, Dominion Department of Agriculture, Hull, Quebec.

EMPLOYING the same antigens as in study 1, for comparative complement fixation tests among 156 samples of sera which neutralized 10 m.l.d. of virus as determined by guinea pig inoculation, agreement between the two test methods varied considerably. The best agreement (51 per cent) resulted from the antigen of Casals and Palacios. On the other hand, among 397 samples, similarly compared, which did not neutralize virus as revealed by the guinea pig method, disagreement was marked between the test methods. The greatest disagreement (36 per cent) resulted from the use of the antigen of Casals and Palacios. These results along with those obtained with the other two antigens are condensed in table 1.

Neutralizing and non-neutralizing sera, consisting of 85 and 154 samples respectively, which had reacted positively by complement fixation with one or other of the three specific antigens in the original tests, were re-tested in the same manner with the specific antigens

TABLE 1

Type of Sera	No. Tested	Reacting to Antigens					
		Casals & Palacios		Infected G.P. Brain		Infected Am.-all. Fluid	
		No.	%	No.	%	No.	%
Neutralizing (by G.P. Method).....	156	80	51	47	30	38	24
Non-Neutralizing (by G.P. Method).....	397	145	36	62	15	8	2

and also with corresponding non-specific antigens, i.e., antigens lacking the specific virus. Condensation of the results will be found in table 2, in which variations in results from the original tests, and marked non-specificity, especially with antigens prepared from brain tissue, are indicated.

TABLE 2

Type of Sera Reacting in Original C.F. Tests to All Antigens	No. Retested	Reacting to Antigens											
		Casals & Palacios				G.P. Brain				Am.-all. Fluid			
		Specific		Non-Specific		Specific		Non-Specific		Specific		Non-Specific	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Neutralizing (by G.P. Method)..	85	64	75	26	30	34	40	43	50	32	37	2	2.3
Non-Neutralizing (by G.P. Method)..	154	102	66	61	39	58	37	75	48	9	5	3	1.3

On the hypothesis that the antigen of Casals and Palacios when employed in complement fixation tests is more specific for antibodies produced by virus infection than those produced by vaccination, eight sera, obtained from donors before vaccination, which neutralized virus by the guinea pig method and may therefore be considered post-infection samples and eight samples from the same donors after vaccination, which also neutralized virus, were studied comparatively with the specific mouse brain antigen of the above authors and with corresponding non-specific antigen prepared from the brains of healthy mice. The condensed results as shown in table 3 did not support the hypothesis advanced. Also, although the number of samples tested was small, the results suggest that the implied specificity of the antigen of Casals and Palacios for diagnosing human infection given in publications on the subject is absent, since only five of the eight pre-vaccination (post-infection) samples reacted to the specific antigen and three of these also reacted to the non-specific antigen.

TABLE 3

Type of Neutralizing Sera	No. Tested	Reacting to Antigens			
		Specific		Non-Specific	
		No.	%	No.	%
Pre-vaccination..... (Post-infection)	8	5	62.5	3	37.5
Post-vaccination.....	7*	7	100	1	14.2

*1 sample anticomplementary

Acute Bovine Mastitis caused by Pneumococcus Type III. F. W. SCHOFIELD and L. C. SWAN, Department of Bacteriology, Ontario Veterinary College, Guelph.

THE purpose of this paper is to report an outbreak of mastitis in cattle due to an unusual infection—the *Pneumococcus mucosus* (Pneumococcus Type III). As far as we can ascertain, this is the first record of pneumococcus isolation from the bovine udder in acute mastitis.

Clinical History. A total of seven cows, all in the same milking lines, were affected, five almost simultaneously and two five days later. In some cases all four quarters were affected. The quarters were swollen and the milk secreted was "slimy" in consistency. The temperatures were 104°-105° F., and anorexia was present in most cases. The milk flow was greatly reduced. Sulphanilamide was given in the usual doses, with some improvement. A vaccine was prepared and given to the whole herd to prevent spread of infection. All cases recovered and the milk flow returned almost to the pre-infection level. Sulphathiazole was substituted for sulphanilamide.

Physical Appearance of the Milk. This was unusual. The milk was grayish-white in colour and composed of fibrinous clots and a turbid serous fluid. This latter was slimy or mucoid, so that short strings remained attached to the needle when this was inserted into and withdrawn from the fluid.

Stained Smear. Polymorpho-nuclear leucocytes were numerous and there were many long chains of streptococci which appeared to be capsulated. When stained by dilute carbolfuchsin, well-defined large capsules could be seen.

Cultivation. Cultures were made on blood agar which in twenty-four hours gave a characteristic growth of medium-sized glistening moist colonies. When removed by the needle, long threads of mucin were formed. The physical appearance of the colony resembled that of the *Str. mucosus capsulatus.* The organism was typed by the Provincial Board of Health Laboratories and reported as Pneumococcus Type III.

Source of the Infection. This could not be ascertained with certainty. However, the most likely source of the infection was the owner. He stated that one week prior to the outbreak he had suffered from a severe cold, with marked nasal discharge. He was diffident about submitting a nasal swab for bacteriological examination. Some time after the outbreak, a rather unsatisfactory sample of nasal secretion was examined, with negative results.

It is of interest and importance from a public health point of view to know that an organism of the pneumococcus group may cause acute mastitis in cattle resulting in mass infection of the milk. No safeguard apart from pasteurization of the milk can protect against such serious contamination of the milk supply.

The Sensitization of Guinea Pigs with BCG for Use in the Standardization of Tuberculin by the Intracutaneous Method. C. W. MCINTOSH and H. KONST, Division of Animal Pathology, Science Service, Dominion Department of Agriculture, Hull, Quebec.

THE obvious disadvantage connected with the use of tuberculous guinea pigs in the standardization of tuberculins and the difficulty encountered in the selection of a virulent strain, which under constant experimental conditions would produce a uniform skin sensitivity has led to the trials with BCG reported in this paper.

1. A single intraperitoneal dose of 30 mgs. BCG produces a reasonable degree of reactivity, maintained on a fairly high level well beyond a six-month period, but occasionally causing a high percentage of mortality due to secondary infections.

2. The reduction of the intraperitoneal dose to 20 mgs. eliminates these disturbing complications without greatly interfering with the sensitizing effect of BCG.

3. Standardization of tuberculin conducted on guinea pigs sensitized by this method gives closely comparable results to those obtained on guinea pigs rendered allergic by subcutaneous injection of virulent tubercle bacilli.

4. Resensitization trials on guinea pigs with intraperitoneal and subcutaneous doses of BCG injected in various doses and at various intervals have no appreciable value.

Some Nutritional Requirements of Clostridium Perfringens. D. C. B. DUFF, Department of Bacteriology and Preventive Medicine, The University of British Columbia, Vancouver.

WASHED vegetative cells of *Clostridium perfringens* (3 strains) grew well in a medium consisting of suitable salts, glucose 1.0 per cent, sulphuric acid hydrolysate of "vitamin-free" casein 1.0 per cent and 0.05 per cent to 0.10 per cent yeast extract. Growth was maintained without diminution for several subcultures, and the fermentation was of the gassing, acetic acid-butyric acid type associated by Pappenheimer and Shaskan (3) with toxin production. Very small but definite amounts of θ hemolysin, hot-cold hemolysin and lecinthinase were formed.

The nature of the accessory growth substances in the yeast extract was investigated by following closely the fractionation methods of Edgar and Macrae (2). Autoclaving the extract at 120° C. for 6 hours at pH 5.0 to destroy thiamin did not diminish its activity. Repeated adsorption on fullers' earth at pH 1.4 yielded a filtrate and an eluate which upon recombination were as effective as the original extract. The fullers' earth filtrate alone supported diminished growth; after treatment with Lloyd's reagent (to remove traces of pyridoxin, cf. Siegel et al, 4), it was possible to maintain only trace growth, although it was still fully effective in combination with the fullers' earth eluate. The essential factor in the Lloyd's-treated filtrate was found to be removed completely by adsorption on Norite charcoal at pH 3.6 and was fully replaceable by calcium pantothenate at 1.0 mg./ml.

The fullers' earth eluate by itself maintained only trace growth. Its activity was not affected by removal of riboflavin by treatment with basic lead acetate. Adsorption on Lloyd's reagent at pH 1.0 removed an essential factor or factors. On this basis, replacement of the eluate with pyridoxin was tried and it was found that pantothenate plus pyridoxin could support only trace growth, and in some tests no growth, on the hydrolysate medium. When pantothenate and pyridoxin (1.0 mg./ml.) were supplemented with the riboflavin-free, pyridoxin-free eluate, good and continued growth again occurred. The nature of the factor concerned is as yet unrecognized. Its activity is not replaced by any one of the following substances: beta-alanine, adenine, choline, nicotinic acid, uracil, biotin, folic acid concentrate, oleic acid, pimelic acid, inositol, para-aminobenzoic acid, yeast nucleic acid, sporogenes factor.

Media made with different batches of casein hydrolysate, plus only pantothenate and pyridoxin, gave varying results of zero, trace, and in one case (commercial casein) fair growth. Elimination of hydrolysates as irregular sources of unknown factors was desirable and a purer nitrogen source was sought. The following mixture of 13 amino acids was found to replace casein hydrolysate completely as to continued growth, and almost completely as to density of growth:

arginine.....500 mg./1	histidine.....500 mg./1	phenylalanine...200 mg./1
aspartic acid...200 mg./1	leucine.....300 mg./1	serine.....200 mg./1
cystine.....400 mg./1	lysine.....200 mg./1	tryptophane.... 50 mg./1
glutamic acid...200 mg./1	methionine....200 mg./1	tyroxine.....300 mg./1
		valine.....300 mg./1

By eliminating single amino acids in turn from the mixture, growth was found to fail completely in the absence of cystine and of tyrosine, and to occur very poorly in absence of glutamic acid. Absence of other amino acids made little difference except that withdrawal of aspartic acid, serine, and tryptophane diminished growth slightly, while removal of arginine allowed a slight enhancement of growth. A medium containing only cystine, tyrosine and glutamic acid, with glucose, salts and 0.1 per cent yeast extract, was found to maintain good growth indefinitely, whereas the same medium less all amino acids gave only trace growth on inoculation and none on subculture. Addition of tryptophane, serine and aspartic acid (which exerted slight stimulation of growth in the 13 amino acid medium) to the 3 amino acid medium resulted in complete inhibition of growth in two of the three *perfringens* strains, and produced neither inhibition nor stimulation of the third.

With media containing either 3 or 13 amino acids, good growth of the acetic acid-butyric acid type was maintained when growth substances were supplied as yeast extract, as recombined fullers' earth filtrate and eluate, or as pantothenate plus eluate. The riboflavin-free, pyridoxin-free eluate, however, which on casein hydrolysate media completely supplemented pantothenate and pyridoxin, was now found inadequate to maintain growth in presence of these substances. This reduction in activity was compensated by the addition of biotin (.001 mg./ml.) and nicotinic acid (0.5 mg./ml.) to the extent that growth of about one-half the density of that on yeast extract media could be maintained on serial subculture. Pantothenate, pyridoxin, nicotinic acid and biotin together were inactive unless supplemented by the unrecognized factor in the riboflavin-free, pyridoxin-free eluate. Definite increase in density occurred on addition of oleic acid (1.0 mg./ml.) and slighter and variable stimulus occurred on addition of uracil (1.0 mg./ml.), thiamin (0.1 mg./ml.), and para-aminobenzoic acid (0.5 mg./ml.). While addition of all four of the latter substances helped to raise the density of growth close to that of the controls, none appeared necessary for the continued existence of the cultures at a lesser intensity of growth. Small and variable amounts of Θ-hemolysin, hot-cold hemolysin and lecithinase could still be detected.

SUMMARY

Three strains of *Cl. perfringens* have been grown on a medium chemically defined except for a factor present in fullers' earth eluate of yeast extract. In addition to this factor, the medium contained: calcium pantothenate, pyridoxin, biotin, nicotinic acid; cystine, tyrosine, glutanic acid; glucose, inorganic salts. Growth was further stimulated on addition of oleic acid, uracil, thiamin and para-aminobenzoic acid.

NOTE: While the above material was in preparation, Ballentine and associates in November 1944 (1) have recorded the presence in yeast extract of an unidentified growth factor for *Cl. perfringens*. Since the methods of preparation differ radically, and since an amount of our material sufficient for chemical analysis is not at present available, the relationship of Ballentine's factor to that described above cannot be determined.

REFERENCES

1. Ballentine, R., Tuck, G. M., and Oser, B. L.: J. Am. Chem. Soc., 1944, *66*: 1990.
2. Edgar, C. E., and Macrae, T. F.: Biochem. J., 1937, *31*: 886.
3. Pappenheimer, A. M., and Shaskan, E.: J. Bact., 1944, *47*: 413.
4. Siegel, L., Melnick, D., and Oser, B. L.: J. Biol. Chem., 1943, *146*: 361.

Chemotherapy and Antitoxin Therapy of Experimental Gas Gangrene (Cl. welchii). C. O. SIEBENMANN and HELEN PLUMMER, Connaught Laboratories, University of Toronto.

THE relative value of various sulfonamides, including marfanil, for local and systemic treatment of experimental *Cl. welchii* infection in mice is discussed and compared with the effect of penicillin. Experiments are presented which show the results of antitoxin therapy and of the combination of antitoxin with various forms of chemotherapy.

Active and Passive Immunity to Cl. Oedematiens in Guinea Pigs. G. G. WATERS and P. J. MOLONEY, Connaught Laboratories, University of Toronto.

PRELIMINARY experiments indicated that guinea pigs could be actively immunized with Oedematiens toxoid to withstand the lethal effect of Oedematiens spores. Promising results were obtained on the protective action of Oedematiens antitoxin in guinea pigs previously inoculated with lethal doses of Oedematiens spores.

Some Observations on the Assay of Penicillin. ELIZABETH CAMPBELL, M. NAROD, and J. GIBBARD, Laboratory of Hygiene, Department of National Health and Welfare, Ottawa.

THE method of assay of penicillin as it has been carried on for the past few months

at the Laboratory of Hygiene is presented and some of the advantages and disadvantages of the cup plate method are discussed.

In general the details of the assay method can be specified but there are certain variables which may be difficult to control. The maintenance of standardized conditions throughout is an essential feature of an accurate assay. Variables such as the accuracy of dilutions and the test culture are among the more important factors which must be carefully controlled if a high degree of accuracy is to be an actuality. The overall accuracy of this cup plate assay method is approximately ± 5 per cent and adherence to this standard is within the limits of practical testing.

A Simplified Method for the Assay of Antibiotics. IGOR N. ASHESHOV and FRIEDA STRELITZ, Faculty of Medicine, The University of Western Ontario, London.

SOFT nutrient agar (about 0.3 per cent), which allows abundant growth of the test organism, is inoculated in bulk with staphylococci or *B. coli*. It is distributed into tubes and is left to solidify in an upright position. The solution to be tested is added on the top of the stab. The intensity of antibiotic activity is determined by the depth of the clear layer of growth inhibition extending downwards from the area of contact between the agar and the solution.

In the assay of pencillin, when carried out in the same way as described for Heatley's cylinder method, a curve similar in shape to that given by the older method is obtained.

The method is applicable to a variety of other antibiotics and is particularly useful in the survey of large numbers of mould cultures and in the follow-up of the development of their antibiotic activity.

Note.—The following papers, which are not given in abstract form here, will be published in full in later issues of the JOURNAL: *Heavy Pollution of a Drilled Well*, by A. R. Foley; *A Second Attack of Poliomyelitis after an Interval of Thirteen Years*, by J. Wyllie; and *A Rapid Method for the Production of Citrinin*, by J. Wyllie. A number of the other papers will also be published in full.

Abstracts

The Use of Penicillin Pastilles in Oral Infection

TREATMENT of oral infections with penicillin pastilles was undertaken after preliminary investigations had demonstrated that the penicillin derived from such pastilles was present in effective concentration in the saliva, that this concentration could be maintained, that the pastille base did not interfere with the action of the penicillin, that the pastille would keep and remain active after manufacture and after the effective dosage of penicillin per pastille had been determined. No apparent loss of activity was found in pastilles three months old. The dosage adopted was 500 units of penicillin in each pastille although only 250 units has been found adequate and is now used for acute ulcerative gingiovostomatitis (Vincent's type).

The method of employment is extremely simple; a pastille is placed in the buccal sulcus and when it has dissolved is replaced by another. One should be inserted last thing at night and replaced should the patient wake. Treatment by this method of twenty-five cases of acute ulcerative gingivostomatitis (Vincent's type) was most gratifying. The condition cleared up rapidly and completely so that treatment could be stopped within five days. No case has relapsed in a period of 3½ months. Clinical improvement coincided with reduction in numbers of the spirochaetes and fusiform bacilli.

Early experiments had shown a striking reduction in the number of bacteria in the normal mouth and throat including hæmolytic streptococci. Accordingly the treatment was tried in a group of seventeen patients with acute tonsillitis including four cases of scarlet fever. The majority became afebrile in twenty-four hours and all were afebrile in forty-eight hours, with great relief from local symptoms. This clinical improvement was accompanied by the disappearance of the hæmolytic streptococci except in three cases (scarlet fever) from whom they were recovered in small numbers.

The results in twelve asymptomatic carriers were not so satisfactory. All became bacteriologically negative while on treatment but in the majority the organisms reappeared some days after cessation of treatment.

Prophylactic use of the pastilles is suggested by the results in a small series of cases of surgical conditions of the mouth and throat. Suppression of pathogenic organisms was evident and symptoms ameliorated.

Alexander B. MacGregor and David A. Long, Brit. M. J., 1944, Nov. 25, p. 686.

Some Mistaken Diagnoses in the Common Infectious Fevers

THE author has called on his experience in a fever hospital to point out the pitfalls in the diagnosis of "everyday" infectious disease. The basis of the review consists of 3,516 cases of diphtheria, 2,102 cases of scarlet fever, and a miscellany of 700 other diseases all admitted to the City Isolation Hospital, Plymouth, over the past 5 years. The diagnosis finally established in hospital is contrasted with that of the family physician who sent the case in and in this way the errors in diagnosis are seen in their order of frequency. For instance, in the diphtheria cases, 13 per cent were sent in as some other illness. Tonsillitis, as would be expected, headed the list of errors and amounted to 72 per cent. Scarlet fever came next, accounting for 14 per cent, and third in frequency was Vincent's angina and stomalitis. A miscellany of other diagnoses, 14 in number, accounted for the remainder of the errors. The discussion of the clinical features and differential diagnosis of these cases should make most interesting and profitable reading for health officers and general practitioners but is too detailed to include here.

The mistakes in and differential diagnosis of scarlet fever, typhoid fever, acute anterior poliomyelitis and cerebrospinal fever are dealt with in similar fashion.

D. F. Johnstone, Brit. M. J., 1944, October 28, p. 555.

A Laboratory Test for Diagnosis of Smallpox

RECORDED here is an account of a new test and its use for the diagnosis of smallpox and its differentiation from chickenpox. The test, described in detail, appears relatively simple. It consists essentially of obtaining

scrapings from early papules or vesicles from which smears are prepared and stained. Microscopic examination is then made for the elementary bodies of variola. These are usually present in large numbers and are regular in size, shape and staining reaction. In contrast, in varicella, elementary bodies are usually scarce or absent, are considerably smaller and stain feebly. These findings and conclusions are based on a study of over 100 cases of variola and 80 cases of varicella. In one series of 80 variola cases, laboratory and clinical findings corresponded in 96 per cent. This test has advantages of speed and simplicity over other laboratory methods of diagnosis of variola and perhaps most important of all can be applied on the first day of the rash.

C. E. van Rooyen and R. S. Illingworth, Brit. M. J., 1944, October 21, p. 526.

The Use of Vaccines for the Common Cold

THIS review may be regarded as an authoritative appraisal of the value of vaccines for prevention of the common cold. The inherent difficulties in investigation of their value are pointed out. These relate to the multiplicity of causative or complicating agents, uncertainty of diagnosis, lack of reporting, great variation in frequency and symptomatology in individuals and communities from year to year and the unreliability of subjective accounts of severity and duration. Again, the vaccines advocated vary so widely in their content, preparation and method of administration that their standing must be regarded still as purely experimental.

In considering the evidence advanced for their use, individual case reports are valueless. Only those studies are dealt with here in which qualified observers investigated vaccines in large numbers of persons for a sufficiently long period of time. Analysis of such reports in which vaccines were administered by oral or parenteral routes or as a spray to nasal mucous membranes indicates clearly that none of the vaccines now available when administered by the routes advised has proved of value.

Use of vaccines against the common cold should be regarded as experimental and limited to suitable groups. Their general promotion and distribution is wasteful and should be discouraged.

The Council on Pharmacy and Chemistry, and the Council on Industrial Health, J.A.M.A., 1944, 126: 895.

The Effect of Vitamin Supplements on Normal Persons

FIVE groups of apparently normal medical students and technicians, 40 persons to a group, were used as subjects in this study. One group received placebos, the others various vitamins. The supplements were taken for one month, during which time normal activities and "the usual American diet" were continued. No subject knew to what group he belonged or what he was receiving. Each person was provided with a work sheet to be kept daily on which he recorded his impressions as to appetite, energy and "pep", general health, "gas" and indigestion, weight, abdominal pain, nausea and vomiting, diarrhœa and any extraneous factors which might have been of significance.

The data submitted by each subject were evaluated without knowledge of what supplement he had been taking. On this basis it was found that the great majority in each group reported no change in regard to appetite, energy and "pep", weight, and general health. The number recording improvement in these respects was approximately the same in the placebo group as in those receiving vitamin supplements. No significant differences were noted regarding "gas" and indigestion by the various groups. In one group which was taking yeast there was a definite increase in the number of subjects reporting abdominal pain. Likewise there was an increased occurrence of nausea, vomiting and diarrhœa in those taking yeast or liver extract in addition to vitamin supplements.

Claims to the effect that vitamins will stimulate the appetite, energy and general health even in apparently normal persons were not borne out by this study. No demonstrable beneficial effects were observed.

Julian M. Ruffin and David Cayer, J.A.M.A., 1944, 126: 823.